

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
29 September 2005 (29.09.2005)

PCT

(10) International Publication Number
WO 2005/090357 A1

(51) International Patent Classification⁷: **C07D 491/04**,
498/04, 513/04, 515/04, A61K 31/436, A61P 9/06

Oaza Shiraoka, Shiraoka-machi, Minamisaitama-gun,
Saitama, 3490294 (JP).

(21) International Application Number:
PCT/JP2005/006004

(74) Agents: **HANABUSA, Tsuneo** et al.; c/o Hanabusa Patent
Office, Shin-Ochanomizu Urban Trinity, 2, Kandasuru-
gadai 3-chome, Chiyoda-ku, Tokyo, 1010062 (JP).

(22) International Filing Date: 23 March 2005 (23.03.2005)

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ,
TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA,
ZM, ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2004-084605 23 March 2004 (23.03.2004) JP

(71) Applicant (for all designated States except US): **NISSAN
CHEMICAL INDUSTRIES, LTD.** [JP/JP]; 7-1, Kandan-
ishiki-cho 3-chome, Chiyoda-ku, Tokyo, 1010054 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **OHRAI, Kazuhiko**
[JP/JP]; c/o Nissan Chemical Industries, Ltd. Chemical
Research Laboratories, 722-1, Tsuboi-cho, Funabashi-shi,
Chiba, 2748507 (JP). **SHIGETA, Yukihiro** [JP/JP]; c/o
Nissan Chemical Industries, Ltd. Chemical Research
Laboratories, 722-1, Tsuboi-cho, Funabashi-shi, Chiba,
2748507 (JP). **UESUGI, Osamu** [JP/JP]; c/o Nissan
Chemical Industries, Ltd. Chemical Research Laborato-
ries, 722-1, Tsuboi-cho, Funabashi-shi, Chiba, 2748507
(JP). **OKADA, Takumi** [JP/JP]; c/o Nissan Chemi-
cal Industries, Ltd. Chemical Research Laboratories,
722-1, Tsuboi-cho, Funabashi-shi, Chiba, 2748507 (JP).
MATSUDA, Tomoyuki [JP/JP]; c/o Nissan Chemical
Industries, Ltd. Biological Research Laboratories, 1470,

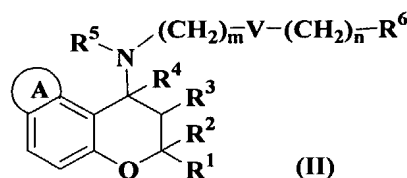
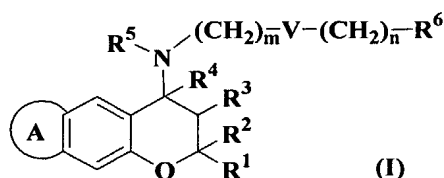
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO,
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: TRICYCLIC BENZOPYRAN COMPOUND AS ANTI-ARRHYTHMIC AGENTS



(57) Abstract: This invention relates to benzopyran derivatives of formula (I) or (II), or pharmaceutically acceptable salts thereof wherein R¹ and R² are independently of each other hydrogen atom, C₁₋₆alkyl group or C₆₋₁₄aryl group, R³ is hydrogen atom or C₁₋₆alkylcarbonyloxy group, or together with R⁴ forms a bond, R⁴ is hydrogen atom, or together with R³ forms a bond, m is an integer of 0 to 4, n is an integer of 0 to 4, V is a single bond, CR⁷R⁸, NR⁹, O, S, SO or SO₂, R⁵ is hydrogen atom or C₁₋₆alkyl group, R⁶ is hydrogen atom, C₁₋₆alkyl group, C₃₋₈cycloalkyl group, C₃₋₈cycloalkenyl group, amino group, C₁₋₆alkylamino group, di-C₁₋₆alkylamino group, C₆₋₁₄arylaminogroup, C₂₋₉heteroarylaminogroup, C₆₋₁₄aryl group, C₂₋₉heterocyclyl group, A is 5-, 6- or 7-member ring fused with benzene ring, as constituent atom of the ring, oxygen atom, nitrogen atom or sulfur atom may be contained in the number of 1 to 3 alone or in a combination thereof, the number of unsaturated bond in the ring is 1, 2 or 3 including an unsaturated bond of the benzene ring to be fused, carbon atoms constituting the ring may be carbonyl or thiocarbonyl. These compounds are useful as an anti-arrhythmic agent.